



Buildings for the 21st Century

Buildings that are more energy-efficient, comfortable, and affordable...that's the goal of DOE's Office of Building Technology, State and Community Programs (BTS). To accelerate the development and wide application of energy efficiency measures, BTS:

- Conducts R&D on technologies and concepts for energy efficiency, working closely with the building industry and with manufacturers of materials, equipment, and appliances
- Promotes energy/money saving opportunities to both builders and buyers of homes and commercial buildings
- Works with State and local regulatory groups to improve building codes, appliance standards, and guidelines for efficient energy use
- Provides support and grants to States and communities for deployment of energy-efficient technologies and practices



LIGHTING FIXTURES: RESIDENTIAL RECESSED DOWNLIGHTS TECHNOLOGY PROCUREMENT

The US Department of Energy (DOE) is sponsoring a program to introduce new, high-efficiency residential recessed downlights into the market. Pacific Northwest National Laboratory (PNNL) is implementing the program on behalf of DOE. Key partners in the program include electric utilities and regional energy efficiency market transformation organizations.

Background

DOE, Northeast Energy Efficiency Partnerships (NEEP), and others have identified residential recessed downlights (also known as recessed cans) as an energy-intensive product in need of design improvements. A recent NEEP survey found that new single-family homes have, on average, 23 cans per home. Heavy use of recessed cans in new and remodeled homes is contributing to the rapid growth of residential lighting energy use, estimated to be about 1500 kWh per year per household.

Recessed downlights are by far the most popular residential lighting fixture. The U.S. Census Bureau reports that 20.4 million of these fixtures were sold in 1999. Although precise numbers on the installed stock are not available, a conservative estimate is that at least 150 million cans are currently installed in American homes, virtually all using incandescent light bulbs.

There is a need for cost-effective, efficient recessed cans that are airtight, rated for insulated ceilings (IC-rated), and designed to use hard-wired compact fluorescent lamps (CFLs). Such products save energy compared to currently available fixtures in two

ways: 1) by replacing incandescent light bulbs of 60-100 watts with CFLs of 18-46 watts, and 2) by eliminating air leakage through the fixture. Non-airtight cans waste energy by allowing heated or cooled air to escape into attics and other unconditioned spaces in a house.

Technology Procurement

Technology procurement is a method to "pull" new technologies and products into the marketplace through competitive procurements backed by large volume buyers. It involves a multi-step process including:

- ✓ Organization of large volume buyers and market influencers (such as utilities providing incentives for energy efficiency);
- ✓ Issuance of a competitive solicitation to equipment manufacturers requesting bids for new products meeting specifications developed in cooperation with buyers;
- ✓ Promotion and marketing programs to increase buyer interest, and maximize purchase of the newly available products.



RESIDENTIAL RECESSED DOWNLIGHTS

For more information about the DOE Office of Building Technology, State and Community Programs, contact:

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By working closely with potential buyers, technology procurement greatly increases the likelihood that products brought to market will be well received by buyers. By organizing large volume buyers for new products, technology procurement reduces the market risks faced by manufacturers, and allows them to introduce products at more competitive prices.

Program Description

The residential recessed downlights technology procurement has several major elements, described briefly below:

- ✓ **Buyer Engagement and Recruitment:** PNNL sought guidance, assistance with program design, and expressions of interest from potential large volume buyers, including builders, home centers, and government agencies.
- ✓ **Manufacturer / Supplier Engagement:** PNNL informed manufacturers and suppliers about the procurement opportunity, and solicited their guidance and expert knowledge.
- ✓ **Technical Specifications:** Based on market research and discussions with fixture manufacturers and buyers, PNNL developed a set of specifications for high-efficiency, airtight, IC-rated, dedicated CFL recessed cans. Specifications are available at www.pnl.gov/fixtures-rfp.
- ✓ **Product Testing and Field Evaluation:** Qualifying prototype fixtures must complete laboratory and field-testing prior to active promotion by the program. Laboratory tests measure operating temperature and light output, and assess performance and reliability by cycling the fixture on and off continuously in a simulated insulated ceiling. Field tests in model or occupied homes will

provide an opportunity for both builders and occupants to comment on light levels and quality, fixture appearance, ease of installation, and other features.

✓ Program Promotion/Incentives:

With assistance from program partners, new fixtures will be promoted to potential buyers, with special efforts aimed at large volume buyers to establish new products in the market. Utility incentives and other methods will be used in promotions.

Program Update

The program is organized into two phases with each phase having an evaluation period comprising of short/ long term laboratory testing, and 6 months of field testing (concurrent with long term laboratory testing). The Phase I Request for Proposals (RFP) was issued to lighting fixture manufacturers on November 22, 2000. Proposals were received in January 2001. The Phase II RFP was issued July 31, 2001 with proposals received on October 31, 2001. A total of nine (9) products are currently undergoing long-term laboratory testing in a simulated insulated ceiling environment, and field test locations in new homes are being identified. PNNL plans to offer a Basic Ordering Agreement (BOA) to manufacturers of products that successfully complete required laboratory and field tests.

A website has been developed (www.pnl.gov/cfldownlights) to house the technical specifications and information about the project. During the product testing phase, the website will function primarily as a resource for program partners, field test participants, and other interested parties. After BOAs are awarded to manufacturers, and the field-testing is completed, PNNL will revise the site to orient it toward resellers, builders, and consumers. Products should be available for purchase early in 2003.